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BOGSnews

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Estimating Life Loss with Feature Extraction

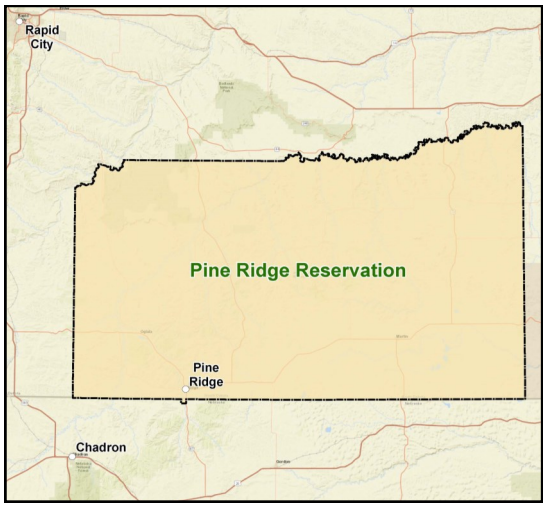
BY DEVIN JOHNSON

Feature extraction involves creating Geographic Information System (GIS) features from imagery. Consider a satellite image of a town with a nearby lake. Feature extraction allows a user to convert all the "blue" pixels in the image into a GIS feature that could be classified as a lake. When performing this type of analysis, there are multiple variables that need to be accounted for. Fortunately, computers can do most of this, but it takes a large amount of memory and computation power. As with any automated image processing, there will be mistakes in the analysis. For example, a blue roof might accidently be classified as a lake. These errors can be minimized by creating training areas to use multiple variables to classify the image. *(Continued on page 2.)*

Pine Ridge Promise Zone

BY JEFF FENNELL

In 2014, President Obama laid out a plan to help create jobs and increase economic opportunities for impoverished communities around the nation. A total of 22 communities have been designated for this initiative called Promise Zones, which includes four tribal communities: the Choctaw Nation of Oklahoma, the Spokane Tribe of Indians, the Turtle Mountain Band of Chippewa Indians, and the Pine Ridge Indian Reservation. The Promise Zone designation comes with 10 years of significant federal funding and support. BOGS is pleased to be part of the assistance for the Pine Ridge Promise Zone. Visit www.usda.gov/promisezones for more information about the initiative.

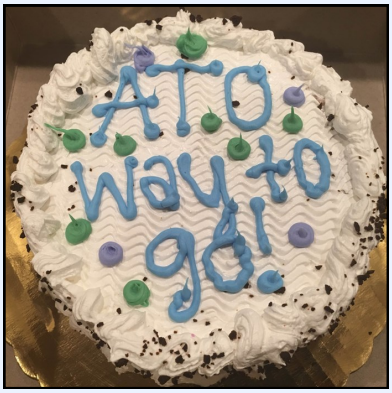


The goal of the BOGS and Pine Ridge Promise Zone partnership is to determine a general plan for scoping any geospatial-related needs for the Pine Ridge Reservation. The first step to achieve this goal is to do an assessment to determine the best path moving forward. The assessment covers research of the current Pine Ridge GIS Program, evaluation of Information Technology (IT) needs, and education through GIS trainings available from BOGS.

BOGS has worked with members of the Oglala Sioux Tribe from the Pine Ridge Reservation for over two decades. The initial effort in developing Pine Ridge's GIS Needs Assessment will be to research their current GIS program. In addition, BOGS will discuss with the Oglala Sioux Tribe how GIS can be applied to service the following critical sectors: Realty and Land Titles and Records; Cultural and Historic Preservation; Health Administration; Public Safety and Justice Services; Transportation; Construction; Agriculture and Irrigation; Water, Sewer, Waste Management; Natural Resources; Education; Economic Development; Reservation Management; and Coordination with Federal Agencies. *(Continued on page 2.)*

Authority to Operate

BY KATIE LEWERS



BOGS has received Authority to Operate (ATO) on twelve web applications. Six of these are web map applications that will be open to the public: Indian Lands, Land Titles and Records Office Locations, Irrigation, Forestry, Colorado River Authority Meter Locations, and Climate Change. All BIA applications must go through ATO before they can implemented.

What is ATO? The ATO is a formal declaration signed by the Director of the BIA, stating that "the required security controls have been, and continue to be, tested and are adequately implemented within the information system and that the risk to agency operations, agency assets, or individuals resulting from the operation of the information system is acceptable." This is based on a rigorous process implemented by the BIA's Division of Information Security.

What's the big deal? While this may not seem to be a big deal, it has been a point of celebration and a milestone for the development staff. Sometimes people do not realize that there is more to the process than just building a web application. The ATO is the culmination of continuous hard work behind the scenes to get web applications to the end users.

Satellite Imagery Now Available

By Steve Mesa

BOGS is happy to announce that satellite imagery from Digital Globe is now available at no cost to all Enterprise License Agreement (ELA) participants. Under the Enhanced View program, the National Geospatial-Intelligence Agency (NGA) acquires imagery and imagery-derived products on behalf of its clients within the U.S. government. This program provides employees of federally recognized tribal entities preemptive access to commercial high-resolution satellite imagery within hours of its collection at *no cost*. Users can access the imagery through Esri's ArcGIS, Google Earth, and other Open Geospatial Consortium compliant tools. Also users can automatically receive notifications when new imagery is available for their area of interest and download imagery in multiple formats such as GeoTIFF, MrSID, NITF 2.1, JPEG, JPEG2000, and Georeferenced PDF. This imagery ranges from 1 meter per pixel to 50 centimeter per pixel from all over the United States. The licensing for this imagery is for two years at a time; therefore, it would be necessary to reorder the software when the licensing expires. If you would like to access this satellite imagery, please have your Primary ELA Point of Contact email geospatial@bia.gov. You will then be provided with the information on how to register to get this imagery. Contact the Geospatial Support Help Desk at 1-877-293-9494 or geospatial@bia.gov if you have any questions or feedback.

Image: Satellite image of the Pine Ridge Reservation. **Source: Digital Globe.**

Pine Ridge Promise Zone (continued)

During the Needs Assessment process, BOGS will evaluate various IT areas to determine their current status and any future needs based on the Pine Ridge GIS goals. BOGS trainers conducted a GIS course in Rapid City as part of the Promise Zone Initiative that many Pine Ridge members attended. BOGS will provide more trainings, networking, and support through the Geospatial Help Desk as needed.

The outcome of the Needs Assessment exercise will be a document summarizing possible plans for moving forward. These findings could include cost assessments as well as potential cost savings. The potential benefits of BOGS support for the Pine Ridge Promise Zone would be economic stimulus for individuals and families, programs and departments, and communities through salaries for professional positions, an enhanced ability to manage data and streamline work flows, and an increased competitiveness for grants and federal funding.

CURRENT STAFF

Chad Wallace
BOGS Branch Chief

Shane Willard, GISP
Geospatial Program Manager/Contract Lead

Steve Mesa, GPC
Program Analyst/ GIS Analyst

Heston Smith
Program Analyst/ GIS Analyst

Donna Offerson
ELA Coordinator/ Technical Support Administrator

Rod Kuhns
GIS Applications Architect

David O'Donnell
GIS Analyst

Devin Johnson
GIS Analyst

Brian Connolly
GIS Analyst

Phillip Julian
GIS Analyst

Travis Blacketter
Cartographer

Brad Tatham, GISP
Senior Geospatial Trainer

Katie Lewers
Geospatial Trainer

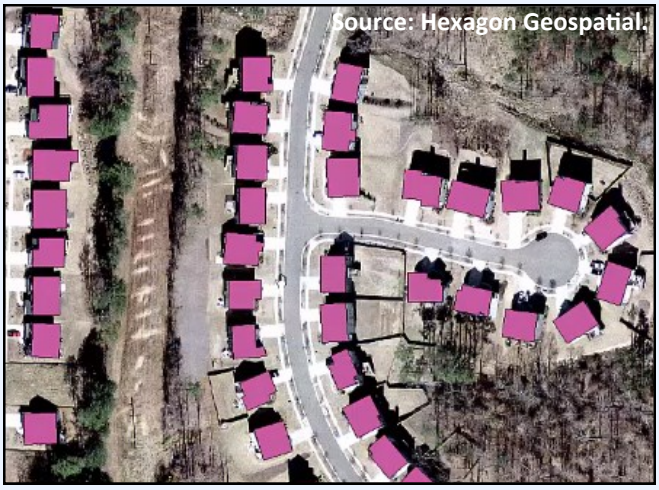
Jeff Fennell, GISP
Geospatial Trainer

Jeff Metius
DTLR Trainer

Estimating Life Loss with Feature Extraction (continued)

Feature extraction is accomplished by constructing combinations of the variables to avoid misclassification while still describing the data with sufficient accuracy.

The BIA Safety of Dams Program is beginning to utilize an ERDAS extension software tool called ERDAS Objective to automate the calculation of life loss for hypothetical dam failure scenarios. The software is able to identify dwellings in satellite imagery by transforming large redundant datasets into a reduced set of features. This process is called feature selection. The reduced set of features is expected to contain the relevant information from the input data allowing an estimation of potential life loss to be performed using the reduced representation instead of the complete initial data. Manually counting dwelling features within a specified area takes hours, but the same task can be completed in minutes using the ERDAS Objective software.

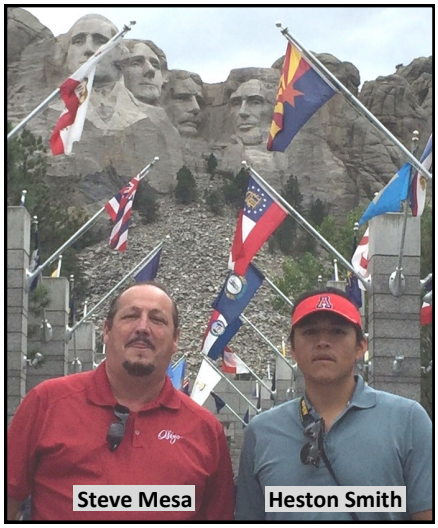


Source: Hexagon Geospatial.

New Staff Members: Steve and Heston

By Steve Mesa & Heston Smith

BOGS recently welcomed two new members to the team! Steve Mesa and Heston Smith bring diverse backgrounds with a tremendous wealth of experience to the BIA.



Bringing more than twenty years of experience in domestic and international GIS analysis and production, Steve Mesa joins BOGS after spending the last thirteen years with the National Geospatial-Intelligence Agency (NGA). During his tenure at NGA as a Geospatial Intelligence (GEOINT) Analyst, he was an expert in the application of mathematical techniques for spatio-temporal analysis to solve complex military and intelligence problems in support of national security. Steve uses analytic tools and technologies such as GIS, quantitative methods and data visualization, modeling, systems analysis, comparative analysis, and database development. Steve also collaborated with internal and external partners to facilitate the use of NGA's GEOINT data.

Heston Smith joins BOGS after spending the last four years with U.S. Army Corps of Engineers (USACE) – Army Geospatial Center. He was part of the Warfighter Support, Terrain Analysis Branch. He supported Army geodatabase editing, map creation, spatial analysis, photogrammetric modeling, the Special Inspector General for Afghanistan Reconstruction's GIS projects, and USACE's Science, Technology, Engineering, and Math outreach programs at the Department of Defense's Quantico Middle and High Schools. Heston has also previously been a Cartographic Tech for Zion National Park and Saguaro National Park, the acting GIS Specialist for Southeast Arizona Group of National Parks, and the GIS Specialist for the US Department of Agriculture – US Fish & Wildlife Service's Chesapeake Bay Nutria Eradication Project.

Aerial Mapping with Drones

By Brian Connolly

Drones have rapidly increased in popularity and affordability over the past several years, but what exactly is a drone and how can they be used to assist with your mapping needs? Drones, Unmanned Aerial Vehicles (UAVs), or Unmanned Aerial Systems (UASs) are aircraft without a human pilot on board, and are instead controlled by an operator on the ground. UAVs typically have a sensor (or camera) attached that provides the user with a unique view of a study area, which allows for further analysis. High resolution aerial imagery can be collected at increased temporal resolution for a fraction of the cost, allowing users to create highly detailed orthomosaic images, 3D point-clouds, and Digital Elevation Models which can be used for a variety of applications. Some applications of UAVs include: infrastructure inspection, surveying, land-use change detection, and agricultural monitoring. The amplified use of UAVs by the public has led to an increase in safety concerns and regulations surrounding the appropriate uses of drones. To ensure safety, it is important to know when and where drones can be flown. The Federal Aviation Administration (FAA) recently announced new rules pertaining to UAVs and operators. These rules are described in detail on the FAA website within the Small UAS Rule Part 107 (www.faa.gov/uas/) and are summarized below:

- Unmanned aircraft must weigh less than 55 pounds.
- Aircraft must remain within visual line of sight of the remote pilot or observer.
- Aircraft must not operate over any persons not directly involved in operation.
- UAV must yield right of way and not impede upon operations of manned aircraft.
- Maximum altitude of 400 feet above ground level.

The Department of Interior and the BIA are currently researching ways to implement UAVs into research and data collection, specifically in areas where it is unsafe or too expensive to use traditional manned aircraft. Esri recently released its Drone2Map software, which can help streamline data processing; however, it is currently not part of the Enterprise Licensing Agreement. If you are interested in learning more about how to safely incorporate UAVs into your data collection needs, check out www.knowbeforeyoufly.org for more information. Also be sure to read the FAA Small UAS Rule Part 107 before planning your mission.

Free Online Training with Esri e-Learning

By Donna Offerson

Access to Esri's self-paced online courses is now managed on the My Esri site. Every individual listed as an authorized ArcGIS user under an active ELA account is eligible for access to Esri self-paced e-Learning. The first step to access the free courses is to contact the Geospatial Support Help Desk at 1-877-293-9494 or geospatial@bia.gov and request access to Esri's e-Learning. BOGS will send you an invitation to take Esri Training. When you click on the "Accept Invitation" button in the invitation email, you will be prompted to login to your Esri Account or create an Esri Account if you do not already have one. After logging in, your Esri Account will be connected to the Branch of Geospatial Support's Esri account and you will be able to take the e-Learning courses for free. If you have any questions, contact the Geospatial Support Help Desk at 1-877-293-9494 or geospatial@bia.gov.

OCTOBER 2016 — MARCH 2017
GEOSPATIAL TRAINING SCHEDULE

BOGS provides geospatial training for employees of federally recognized tribal entities and to Office of Trust Services (OTS) supported functions within the BIA. OTS supported functions includes GIS related activities under the Divisions of Real Estate Services, Land Titles and Records, Probate, Natural Resources, Forestry and Wildland Fire Management, and Water and Power. All slots not filled one month before the beginning of the course will then be open to and filled on a first come, first served basis by employees of federally recognized tribal entities and with employees of the BIA from any office.

There is no tuition cost for this training. Training equipment and training materials are provided by BOGS. Expenses for transportation, hotel accommodations, and meals are the responsibility of the participant's organization. Training courses are available at the BOGS Lakewood Training Facility in Lakewood, Colorado and at various field locations per request and availability.

Level	Region	Course Location	Course	Date
Beginner	Eastern	**Penobscot Nation,** Bangor, ME	*Principles of GIS*	Oct 3–6, 2016
Beginner	Midwest	**Keweenaw Bay Indian Community,** L'Anse, MI	*Principles of GIS*	Oct 17–20, 2016
Beginner	Great Plains	**Spirit Lake Tribe,** Fort Totten, ND	*Principles of GIS*	Oct 24–27, 2016
Beginner	Central Office	**Lakewood Training Facility,** Lakewood, CO	*Principles of GIS*	Oct 24–27, 2016
Beginner	Great Plains	**Three Affiliated Tribes,** New Town, ND	*Principles of GIS*	Nov 7–10, 2016
Beginner	Pacific	**Pauma Band of Luiseno Mission Indians,** Pauma Valley, CA	*Principles of GIS*	Dec 5–8, 2016
Beginner	Central Office	**Lakewood Training Facility,** Lakewood, CO	*Principles of GIS*	Dec 5–8, 2016
Beginner	Western	**Fort Mojave Indian Tribe of Arizona,** Mohave Valley, AZ	*Principles of GIS*	Jan 9–12, 2017
Beginner	Great Plains	**Absentee-Shawnee Tribe of Indians of Oklahoma,** Tecumseh, OK	*Principles of GIS*	Jan 9–12, 2017
Beginner	Central Office	**Lakewood Training Facility,** Lakewood, CO	*Principles of GIS*	Jan 23–26, 2017
Beginner	Central Office	**Lakewood Training Facility,** Lakewood, CO	*Principles of GIS*	Jan 30–Feb 2, 2017
Beginner	Eastern Oklahoma	**Alabama-Quassarte Tribal Town,** Wetumka, OK	*Principles of GIS*	Feb 6–9, 2017
Beginner	Northwest	**Yakama Agency,** Toppenish, WA	*Principles of GIS*	Feb 13–16, 2017
Intermediate	Central Office	**Lakewood Training Facility,** Lakewood, CO	*Introduction to Cartography**	Feb 27–Mar 2, 2017
Beginner	Northwest	**Confederated Tribes of the Grand Ronde Community of Oregon,** Grand Ronde, OR	*Principles of GIS*	Mar 6–9, 2017
Intermediate	Alaska	**Chugachmiut,** Anchorage, AK	*Introduction to Cartography**	Mar 27–30, 2017

All courses are taught in ArcGIS version 10.2.2 and ArcPad 10.2 unless otherwise indicated.
* Indicates this course has a prerequisite.

Due to the high demand for training, please register early to help ensure placement in the requested course.
To register for a course, email or fax a completed and signed registration form to geospatial@bia.gov**.**
Visit the Geospatial Support website at http://bia.gov and select **Geospatial** from the dropdown, call the Geospatial Support Help Desk at 1-877-293-9494, or email geospatial@bia.gov for a copy of the latest training brochure, which includes a registration form, course descriptions, cancellation and absence policies, priority information, and other training policies.